

What is claimed is:

1. A foam article comprising a polymer foam with at least one of its major surfaces being smooth to an Ra value less than about 75 micrometers, as measured by laser triangulation profilometry,

5 said foam comprising a homogeneous distribution of a plurality of thermoplastic expandable polymeric microspheres,

wherein said plurality of expandable polymeric microspheres are at least partially expanded.

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2. The foam article according to claim 1, wherein said foam has a center and a uniform size distribution of said at least partially expanded expandable polymeric microspheres from the major surfaces to the center of said foam.

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3. The foam article according to claim 1, wherein said plurality of expandable polymeric microspheres are at least mostly expanded.

4. The foam article according to claim 1, wherein said polymer foam has a pattern embossed on at least one major surface of said polymer foam.

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5. The foam article according to claim 4, wherein said pattern is a microreplicated pattern and said polymer foam is not significantly crushed.

6. The foam article according to claim 1, wherein said polymer foam is  
25 substantially free of broken polymeric microspheres.

7. The foam article according to claim 1, wherein said foam article is a pressure sensitive adhesive article or a heat-activated adhesive article.

8. The foam article according to claim 1, wherein said polymer foam is an  
30 adhesive.

9. The foam article according to claim 1, wherein the foam article is one from the group consisting of gaskets, gap-sealing articles, vibration damping articles, tape backings, retroreflective sheet backings, anti-fatigue mats, abrasive article backings, raised pavement marker adhesive pads, medical dressings, and sealant articles.

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10. The foam article according to claim 1, wherein said polymer foam is uni-axially or multi-axially oriented.

11. The foam article according to claim 10, wherein said polymer foam has a matrix and contains microvoids between or a separation of said matrix and said expandable microspheres.

12. The foam article according to claim 1, wherein said polymer foam is crosslinked.

13. The foam article according to claim 1, wherein said foam article comprises at least one other polymer composition in the form of at least one discrete structure bonded to or embedded in said foam.

14. The foam article according to claim 13, wherein said at least one discrete structure is a plurality of discrete structures, and said polymer foam comprises an adhesive composition.

15. The foam article according to claim 1 in combination with a first substrate, wherein said foam article is on a major surface of said substrate and said combination is a multi-layer article.

16. The foam article according to claim 15, further comprising a second substrate having a major surface, wherein said foam article is sandwiched between said first and second substrates.

17. The foam article according to claim 1, wherein said polymer foam comprises an agent selected from the group consisting of tackifiers, plasticizers, pigments, dyes, solid fillers, non-expandable microspheres, blowing agents and combinations thereof.

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18. The foam article according to claim 1, wherein said polymer foam comprises an acrylic foam.

19. The foam article according to claim 1, wherein said polymer foam comprises a matrix comprising a blend of two or more polymers wherein at least one of said polymers in said blend comprises a pressure sensitive adhesive polymer and at least one of said polymers is selected from the group consisting of unsaturated thermoplastic elastomers, acrylate-insoluble saturated thermoplastic elastomers, and non-pressure sensitive adhesive thermoplastic polymers.

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20. The foam article according to claim 1, wherein said foam article comprises a polymer composition bonded to said foam.

21. The foam article according to claim 1, wherein said foam article comprises a plurality of polymer compositions bonded to said foam.

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22. The foam article according to claim 1, wherein said article comprises an adhesive composition bonded to at least one major surface of said foam.

23. A foam article comprising a polymer foam, said polymer foam comprising a plurality of thermoplastic expandable polymeric microspheres, and said plurality of expandable polymeric microspheres being at least partially expanded, wherein said polymer foam exhibits a machine (or longitudinal) direction and crossweb (or transverse) direction standard deviation of density or thickness over average density or thickness ( $\sigma/x$ ), respectively, of less than about 0.2.

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24. The foam article according to claim 23, wherein  $\sigma/x$  is less than about 0.1.

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25. The foam article according to claim 23, wherein  $\sigma/x$  is less than about 0.05.

26. The foam article according to claim 23, wherein  $\sigma/x$  is less than about 0.025.

27. The foam article according to claim 23, wherein said polymer foam comprises a homogeneous distribution of said plurality of thermoplastic expandable polymeric microspheres.

28. The foam article according to claim 23, wherein said foam has a center and a uniform size distribution of said at least partially expanded expandable polymeric microspheres from the major surfaces to the center of said foam.

29. The foam article according to claim 23, wherein said plurality of expandable polymeric microspheres are at least mostly expanded.

30. The foam article according to claim 23, wherein said polymer foam is an adhesive.

31. A foam article comprising a polymer foam, said polymer foam comprising a plurality of thermoplastic expandable polymeric microspheres, wherein said polymer foam was made using polymers having a weight average molecular weight of at least about 10,000 g/mol.

32. The foam article according to claim 31, wherein said polymer foam was made using polymers having a weight average molecular weight of at least about 50,000 g/mol.

33. The foam article according to claim 31, wherein said plurality of expandable polymeric microspheres are at least partially expanded.

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Hef 5 34. A foam article comprising a polymer foam, said polymer foam comprising a plurality of thermoplastic expandable polymeric microspheres, wherein said polymer foam was made using polymers having a shear viscosity, measured at a temperature of 175°C and a shear rate of 100 sec<sup>-1</sup>, of at least about 30 Pascal-seconds (Pa-s).

35. The foam article according to claim 34, wherein said polymer foam was made using polymers having a shear viscosity, measured at a temperature of 175°C and a shear rate of 100 sec<sup>-1</sup>, of at least about 100 Pa-s.

10 36. The foam article according to claim 34, wherein said polymer foam was made using polymers having a shear viscosity, measured at a temperature of 175°C and a shear rate of 100 sec<sup>-1</sup>, of at least about 200 Pa-s.

15 37. The foam article according to claim 34, wherein said plurality of expandable polymeric microspheres are at least partially expanded.

009111 11500 20 38. A foam article comprising:  
a recess; and  
a foam-in-place article comprising a polymer foam comprising a polymeric matrix and a plurality of at least partially expanded expandable polymeric microspheres, and optionally an activated blowing agent, said foam-in-place article being positioned in said recess and partially or completely filling said recess.

25 39. The foam article according to claim 38, wherein said foam-in-place article is an adhesive article.

30 40. The foam article according to claim 38, wherein said recess is a space between two or more surfaces.

41. The foam article according to claim 38, wherein said recess is defined by at least one from the group consisting of two or more opposing and spaced apart substrates, a

through hole, and a cavity

42. The foam article according to claim 38, wherein said foam-in-place article comprises multiple layers, discrete structures or a combination thereof, with each layer and discrete structure having a difference in the way it foams-in-place, a difference in the degree to which it can be expanded in place, or a combination thereof.

43. A foam article comprising a polymer foam that includes:

- (a) a plurality of at least partially expanded expandable polymeric microspheres, and
- (b) a polymer matrix comprising a blend of two or more polymers sufficiently free of urethane crosslinks and urea crosslinks to eliminate the need for isocyanates in said polymer matrix.

44. The foam article according to claim 43, wherein at least one of said polymers in said blend comprises a pressure sensitive adhesive polymer and at least one of said polymers is selected from the group consisting of unsaturated thermoplastic elastomers, acrylate-insoluble saturated thermoplastic elastomers, acrylate-insoluble semicrystalline polymers, acrylate-insoluble amorphous polymers having a solubility parameter of less than 8 or greater than 11, elastomers containing ultraviolet radiation-activatable groups, and pressure sensitive and hot melt adhesives prepared from non-photopolymerizable monomers.

45. A foam article comprising a polymer foam that includes:

- (a) a plurality of expandable polymeric microspheres, and
- (b) a polymer matrix comprising a blend of two or more polymers sufficiently free of urethane crosslinks and urea crosslinks to eliminate the need for isocyanates in said polymer matrix, at least one of said polymers in said blend comprises an adhesive polymer.

46. The foam article according to claim 45, wherein at least one of said polymers in said blend comprises a pressure sensitive adhesive polymer and at least one of said polymers is selected from the group consisting of unsaturated thermoplastic

elastomers, acrylate-insoluble saturated thermoplastic elastomers, acrylate-insoluble  
semicrystalline polymers, acrylate-insoluble amorphous polymers having a solubility  
parameter of less than 8 or greater than 11, elastomers containing ultraviolet radiation-  
activatable groups, and pressure sensitive and hot melt adhesives prepared from non-  
5 photopolymerizable monomers.

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